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THE IRON, THE BRONZE,  
AND THE  
STONE AGES.

BY  
PROFESSOR ROLLESTON,

M.D., F.R.S., F.S.A., OXFORD.

*Reprinted from the Transactions of the Bristol and Gloucestershire  
Archæological Society.*

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I HOPE that in the observations I am about to submit I shall make plain the differences which have enabled antiquaries to divide pre-historic times into two principal divisions, namely, the Stone and the Bronze ages—and to draw a tolerably sharp line of demarcation between these periods—and the Iron age, in which we are now living, and to which the interment examined this day in Oakley Park belonged.

It has been said very truly that "Les divisions des êtres, des objets, des sciences sont la source la plus commune des erreurs de l'esprit humain," and naturalists regard the aphorism "Nature is not so strict a classifier as man," as being one of their common-places. And I do not say that no one of the three ages has been overlapped at either end by another, nor can I accept all the minute subdivisions of these periods which some specialists have urged upon us. But gradations at both ends of any series should not prevent us from seeing, acknowledging, and holding, that it may be distinct enough in its middle; and if old forms of implements and weapons are enabled by isolation as regards locality to live into contemporaneity with newer ones, that is only what happens with older forms of animal and vegetable life which isolation of the same kind often preserve as living fossils, but without for a moment making us doubt the propriety of referring them to an age distinct from ours.

Let us begin with the Iron Age, with the age of which we know most, and so work our way gradually upwards and backwards through the Bronze into the Stone periods. The drawings exhibited represent the implements and weapons used by the Romans and by the Anglo-Saxons, which were of iron. The Roman weapons are, some of them, such as we see them to be on monuments and some other works of art ; but in some instances they were drawings of the actual weapons themselves as found on battle-fields and elsewhere. The *hasta* and *pila* of the Saxon and Frank, for such were in reality their spear and the *angon*, were, on the other hand, found where I have never found the Roman weapons, viz., in the graves of those warriors. This difference, as to the fitting out of their deceased, depended, I would suggest, upon a difference of views as to the future state of the dead ; and this difference did not consist, I apprehend, in that the one race held that the future state would be such a peaceful one that weapons of war would be superfluous in it, whilst the other believed that it would be more or less a continuation of the life of assault and battery they had so richly enjoyed here ; but in a very different opposition of beliefs. The “*sunt aliquid Manes*” of Propertius was as beautiful a piece of poetry to the Roman as any other of the beautiful poetry of that sweet poet, but it was nothing more. The Teuton, on the other hand, held firmly on to the belief in another world ; and this belief accounts for the deposition of weapons in the graves of their dead.

I am inclined to think that the Iron Age would be better spoken of as the “Steel Age.” For there is no reason why we should not suppose that iron, as distinct from steel, may have been in the hands of many tribes before they came into the possession of Bronze ; and if the iron was soft iron merely, bronze would be much more useful and trustworthy for the purposes of war and the chase, for which so many ancient and modern races have mainly lived. A very striking instance from Roman history of the comparative uselessness of untempered iron tools for such purposes is given us by Polybius, Hist. ii., c. 33. There we read, in a probably somewhat unjustly unfavourable account of that somewhat rare animal, a liberal military commander, that his



colonels saved him, as colonels have in later times saved other generals from disasters, by the following tactics. The Gauls came to the fight armed with long pointless soft iron broadswords. These, the Roman tribunes had observed, bent after each blow delivered on to a sufficiently resistant body. Such a body they sought and found in the *pilum*—that best of pikes or bayonets, with which a man could parry or thrust, but with which he could not strike or slash. The brave barbarian came up *ferox viribus*, brandishing his broad-sword, its downward strokes were parried, and the malleable iron, glancing downwards, bent as malleable iron will do, and left its gigantic owner at the mercy of an Italian, some five feet six inches in stature, who then brought into this sword-play a weapon which he had been taught to use *punctim, non cœsim*. The same tactics succeeded at Culloden, as the tactic of thrusting and giving point always will succeed when masses of men in rows, not isolated individuals merely, are pitted against each other on the thrusting *versus* the slashing plan, though the slashing sword at Culloden was of good steel enough. The point for our present purpose in this story of the victory of Flaminius over the Isumbrian Gauls lies in the proof it gives us of the existence, so lately in the world's history as B.C. 224, of a warrior-race fighting with soft iron instead of steel swords.

The red kidney iron ore, which we know so well from the fact of such large fortunes having been made out of it in the country laying north of Ulverston, and that other hematite known as "hematite brun," "Brauncisenerz," "Sumpferz," and the specular iron ore of Elba and Norway are, at once widely "distributed," very rich to their percentage of iron, and allow of its being easily (even if wastefully, as we should consider it) extracted. In the metallic state, Iron is seldom met with naturally; as the Dictionary of Chemistry, *sub. voc.*, p. 335, tells us, *telluric* iron is very rare; and *meteoric* iron, the other variety of native metallic iron, now that the common Greek name for iron is known not to have any relation to any *sidereal* origin, but to express simply the dew-like out-sweating of the metal as reduced in the primitive "bloomeries" of those early Dactyli, Elfins, and Dwarfs, whom we

know as "Tubal Cains," "Vuleans," "Sindris," and "Wayland Smiths," has lost any claim which it may have been supposed to have had to being considered the primitive source of iron weapons. Hence it is of the most consequence to keep in mind the fact that certain widely diffused ores of iron are very easy of reduction, as the examples furnished by the metallurgy of certain African negroes, and of wild tribes in India and in Borneo, abundantly prove. And it is possible enough that in pre-historic times one of the more easily reduced ores of iron may have been reduced, and even found to be malleable, before not only bronze but even the mode of reducing a copper ore was discovered. Still, this would not prove that bronze must, as has been maintained, have, as being a more complex invention, been a later discovery than that particular modification of iron known as steel. The rigid resistant bronze would make a better weapon, especially for that most efficient process of sword-play, "giving point," the thrusting "*punctum*," as opposed to mere slashing *caesim*, of the Roman military writers, than would such soft iron as in the absence of the knowledge of converting iron into steel could only have been available to the savages who reduced it. A pike may "bend bravely," even when made of good steel and *à fortiori*, as the quotation from Polybius shews, when made only of untempered iron. When, however, once the art of making steel out of iron was discovered, and soft iron took on "the ice-brook's temper," the wider diffusion of the material, and the greater facilities of this process of manufacturing an equally useful article out of it, caused the displacement of bronze just as many a similar discovery has caused the displacement of many another product of toilsome elaboration by the introduction of another and simpler one. It should not, however, be forgotten that "cementation" is a preliminary process to that of hardening and tempering in the manufacture of steel, that it is a process requiring several days as well as the combination of several other conditions if it is to be successful, and that the improbability of pre-historic men stumbling early and easily into the knowledge of a process consisting of a considerable number of heterogeneous operations is in spite of the now apparent simplicity of those operations, as great,



perhaps, as the improbability of their similarly stumbling into the discovery of bronze.

Coming in the second place to the Bronze Age, and facing the discussions hereinafter to be bibliographized, I have to say that as against all quotations from old and modern authors and as against all records by whomsoever recorded of the discovery of iron weapons in Bronze Age Tumuli, I am as confident as I can be of anything in Anthropology that no iron will be, though bronze not rarely is, found in Tumuli of the Bronze Period and Round Shape in this country at least. I have been present and assisted in more ways than one at the examination of many "Round," "Bell," "Bowl," "Cone" shaped Barrows, and in the *primary* interment in such Barrows I have never seen any other metal than bronze. It is common enough to find a Saxon burial with iron and bronze both in the superficial layers of such barrows, but the superficial position of such burials shows their posteriority in point of date. The central interment at the bottom of the barrow on or sunk into the natural soil, may or may not contain a bronze dagger, may or may not contain weapons of flint, survivals from, and religious or ceremonial reminiscences of, the Stone Age, may or may not contain vessels of pottery, may contain a skeleton in the contracted position, or burnt bones either in an urn, or in a case of bark, or simply naked in the earth (I have seen all these cases), but it has never contained any shred of iron within my experience, nor, as I believe, within that of any person who can be trusted to distinguish between a primary and a secondary interment.

It will be said by some in answer to this that iron is oxidizable and perishable in an eminent degree, and that it would disappear whilst the bronze would remain. This suggestion I will not characterize as one of the study as opposed to one of the Barrow, but as one of the laboratory, and the laboratory with its strong reagents supports it in a way that the slow and weak or wholly inert chemistry of the deep sand, or rubble, or gravel-filled grave does not. Of course, if you conceive a stream of water, acidulated even slightly with nitric acid, to pass constantly over an iron

spear-head, there is no difficulty in estimating the time which will be necessary for the entire disappearance of an implement so tested. But no such agent is available in many, I might say most, Bronze Period Graves. In some such graves you may find the objects they contain encrusted with a deposit of carbonate of lime, which would have protected an iron weapon of the Bronze Period if there had been any to protect; or you may find, as I am happy often to have seen, the bones in a capital state of preservation and contrasting to great advantage with the corroded and "perished" bones of Saxons *whose iron weapons were, nevertheless, very present with them*; or the grave itself may contain a considerable quantity of free carbonic acid, as other sunk wells do, and yet may be so dry from conditions of superjacent and subjacent rubble and soil as to have afforded no means for the removal of any results of any slight erosion which its contents might have suffered. The phenomena disclosed by the spade must be compared with those disclosed by the test tube; there is here a *makro*—as well as a *mikro*—chemistry.

One of many other convincing arguments for the conclusion that iron came into general use later than bronze, is, to my mind, the fact that in Switzerland you find, as in the museum at Berne, bronze bracelets ornamented with beads of iron, and as in a knife from Mörigen, the blade of a cutting instrument made mainly of bronze but similarly inlaid with strips of steel. On this, Désor and Favre (*Le bel Age du Bronze Lacustre*, 1874, p. 16) remarks "*Or pour qu' on ait employé le fer en guise d'ornement il fallait bien qu' on le tint en grande estime et qui il ne fut pas tres commun.*" The larger use of iron when a thin blade of it was carried on a handle of bronze, the retention by such iron blades of the leaf-shape of the bronze blades which they displaced from their bronze pommels, and finally the exceedingly rich ornamentation of the pummels of the iron swords found at that most instructive discovery at Hallstatt, are all similarly indications that iron was of later introduction than bronze; that at first it was the scareer of the two materials. If, afterwards, iron was made a servant of all work, and bronze was retained simply for the manufacture of

ornaments, as by our Anglo-Saxon forefathers, this is but a history which can be paralleled by that of many other household goods !

Copper, as distinguished from bronze, is, on *à priori* grounds, likely to have been discovered and used long before metallic iron. For it is much more abundant in the metallic state in nature, as for example, in Siberia, in the Faroe Islands, in many Cornish and in some Welsh mines, in Brazil, Chili, and Peru, and, above all, in large masses near Lake Superior, in North America. And, in addition to being there available and obvious as a red metal—or, indeed, *the* red metal—copper is malleable and ductile immediately after fusion, and acquires considerable hardness *when mixed with other metals*. These last five words from the Dictionary of Chemistry *sub. voc.* “Copper,” bring us face to face with the question : Where was made the discovery of the advantages to be gained from alloying copper with tin, and so obtaining bronze ? It was, of course, likely to be made in some district in which the ores of these two metals were to be found in proximity. There are three such areas. Firstly, Cornwall : but as against the claims of our westernmost county are to be set, not only the ratiocinatively weighty words of Cæsar as to pigs or ingots of bronze, *Ære utuntur importato*, but many materially ponderable arguments in the shape of bronze celts themselves demonstrably also imported as manufactured. Secondly, Khorasan : as to existence of tin in which district we have hints from Strabo and from Burnes, but have lately had full and authentic information furnished to us in a paper written by the late illustrious Von Baer but twelve days before his death on November 28th, 1876, and published in the *Archiv für Anthropologie*, ix., 4, p. 262. It appears that the Vice-President of the Imperial Geographical Society of St. Petersburg, Herr Semenow, at the instance of Von Baer, procured the following report as to the existence of tin and copper and other minerals in the neighbourhood of the places tolerably familiar to us, as Herat, Merv, and the Banyan Pass. Here is the Report :—

“Ein Bewohner der Stadt Meschhed, Aga Mamed Kasym Ragim, Arrendator eines der vielen Kupferbergwerke in Chorassan, theilte mir mit, das 20 Farsangen (1 Farsange = annähernd 7 Werst) von



der Stadt Utschan Miot Abot sich die reichsten Lager von Zinn, Eisen, Kupfer, Schwefel und Blei befinden und 2) 6 Farsanger von Meschbed ein Zinnbergwerk das sogenannte Rabotge Alokaband ist. Die Genauigkeit dieser Angaben ist bekräftigt durch den Vorsteher der russischen Kaufmannschaft in Chorassan, den Bucharen Hadschi Ibrahim der wohl bekannt ist mit der hiesigen Gegend und mit vielen Personen die sich mit Bergwerksarbeiten beschäftigen: ausserdem habe ich mich factisch von dem Vorkommen des Zinns hier überzeugt durch Ueberfluss von zinnernen Waschkrügen und grossen Schüsseln alter einheimischer Arbeit, welche aus dem Zinn des Ortes gefertigt sind wie mir die Besitzer sagten.

“Nach den Aussagen der Kauffente, die durch Handelsinteressen mit Merw in Verbindung stehen sind die bergigen Theile Turkmeniens das von Stamme Teke eingenommen wird, überhaupt reich an verschiedenen Erzen unter welchen sich auch Zinn vorfindet. Genauere Nachrichten jedoch über diesen Gegenstand werde ich geben in der Ausarbeitung der Tagebücher meiner Reises im nordöstlichen Persien.

“Hierzu schreibt der Geheimrath Semenow: “Diese Nachrichten sind nach meiner Bestellung gesammelt und mitgetheilt von einem Reisenden, der im Auftrage der Geographischen Gesellschaft und des Herrn Gluchowskoi eine Reise nach Ost Persien (Meschhildo) zu Stande gebracht hat. Er heisst Ogorodnikow.”—P. SEMENOW.

Diese Nachrichten machen es höchst wahrscheinlich, dass zu der vielen Bronze, die man in den Ruinen von Assyrien und Babylonien gefunden hat, das Zinn aus der Gegend von Chorassan kam, wo man die Drangianer zu suchen haben wird. Wie weit hin das Vorkommen des Zinns sich erstreckt, ob bis zum Bamyan Passe der das natürliche Thor im Hindukusch aus Afghanistan und Indien in das Flachland des Orus bildet, bleibt noch künftigen Untersuchungen vorbehalten. Dass aber bis zur Entdeckung der Zinngruben in Cornwallis alles Zinn zu den vielen Bronzen, die in allen Ländern des Mitteltändischen Meeres und in Skandinavien gefunden sind nur aus dieser Gegend kam, möchte ich doch bezweifeln.”

There is yet a third locality in which Copper and Tin are found in a condition of proximity, which may well have led to the combination of them into Bronze. This locality is no less extensive, and no less ancient a seat of human history, than the region lying between Birmah and Banca, inclusively. This is what Morillet writes, *Révue de Anthrop*, i, v, 1875, p. 653.

“Reste les groupe des l'extrême Orient Asiatique. C'est là évidemment où il faut chercher l'origine du bronze. Les principaux gisements sont dans la presqu'île de Malacca et surtout dans l'île de Banca, mais ils s'étendent dans d'autres îles de la Sonde et remontent jusqu'à dans l'empire Birman où l'étain est encore exploité actuellement dans le district de Merguy. Ce minéral, dans tous ces gisements se recueille de la manière la plus simple et plus faciles dans les alluvions. Ces sont bien certainement les alluvions les plus riches du monde en étain et celles qui occupent la plus grande étendue. Il est donc tout naturel que ce soit celles qui les premières aient attiré l'attention de l'homme. La cuivre se rencontre dans les mêmes régions. Tout le monde connaît les gisements de cuivre des îles de la Sonde Timor, Macassar, Borneo. La Birmanie anglaise présente des mines de cuivre à côté des ses exploitations d'étain. Les pays se trouvent donc dans les meilleures conditions pour avoir vu naître l'industrie du bronze.”

Von Baer himself, *l.c.*, thinks that Ceylon may very probably have been one source whence Tin was procured by the Phœnicians trading for it with the Malays, as they traded doubtless with them at second, if not at first, hand for the Cinnamon, which still retains its Malay name little altered, though it has passed through the mouths of so many Western races. I a little doubt the correctness of the introduction of the Malays into the picture; for if the Malays brought Bronze, or even only the ores of either or both of the metals forming it, to meet the Phœnicians at Ophir, it is difficult to understand how they should have failed to carry the knowledge they could not thus have failed to gain, with them on their colonizing expeditions over Polynesia. Yet Polynesia was in the Stone Age till quite recently, though the common fowl and



the pig had been carried to some of the most remote of its islands, and the dog even to New Zealand, in times beyond the memory, if not beyond the traditions of the natives, and long before they came into *rapport* with Europeans; and we learn from Rev. Crawford, Trans. Ethn. Soc., iii., 1865, p. 353, that it was the Gentoo traders of the Coromandel coast, who brought Tin from Malaysia to India, when the Europeans first came into relation with Malaysia in the early years of the 16th century.

There can be no doubt that many of the bronze weapons now found in this country were imported as made up; if my memory does not deceive me, hollow bronze weapons have been found upon our south coasts, containing still the cores on which they had been moulded for the use of our natives, who were balked of them by the shipwreck of the vessel laden for them. On the other hand, masses of bronze in the rough, pigs, that is, or even ingots, have also been found in this country, together with smelting apparatus and moulds; so that bronze must also have been worked up here, as there is abundant evidence (see Klemm, German, Alterthums kunde, 1836, p. 151) to shew it was also in Germany. Every nation, the most refined, perhaps, not more than the most barbarous, has its own fancies as to the patterns of its own weapons, as much as its own clothes, its own architecture, and its own ceremonials; and this feeling of independence would shortly evoke a demand for the raw material and a production of moulding apparatus. A very instructive story, bearing upon the possible working of this desire for variation, is told by Major-General Lane Fox, F.R.S., in a paper on "Primitive Warfare," read by him June 5, 1868, at the Royal United Science Institution. As the paper in question was printed only and not published, it may be allowable here to re-produce it. It runs thus:—

"The next principle which we shall have to consider is that of variation. Amongst all the products of the most primitive races of man, we find endless variations in the forms of their implements, all of the most trivial characters. A Sheffield manufacturer informed me that he had lately received a wooden model of a dagger blade from Mogadore, made by an Arab, who desired to have one of steel made exactly like it; accordingly my informant thinking he had found a convenient market for the sale of such weapons,

constructed some hundreds of blades of exactly the same pattern; on arriving at their destination, however, they were found to be unsaleable. Although precisely of the same type as those in general use about Mogadore, all of which to the European eye would be considered alike, their uniformity rendered them unsuited to the requirements of the inhabitants, each of whom prided himself upon possessing his own particular pattern, the peculiarity of which consisted in having some almost imperceptible difference in the curve or breadth of the blade.

Persons who, like myself, incline to the belief that the regions round the Bay of Bengal were probably the seat, not only of the discovery of the stream-works oxide of tin, but also of that of its alloy with copper, will be tempted to assign more weight than is due to the fact, or supposed fact, of the bronze-swords having such small handles, as may be thought Hindoos or people like them would have. I am not quite clear that this bronze sword, leaf-shaped or other, has always a very small hilt; certainly in some cases, if we imagine the hilt to be wrapped round with leather or other material suitable for the purpose, it will not turn out to be at all too small for the grip of an ordinary English hand of the present day. At any rate there can be no doubt that in this country the skeletons of the Bronze Period belonged to much larger, and stronger, and taller men than did the skeletons of the Long Barrow stone using folk who procured them. In some parts of England the contrast in this matter of size between the men of the Bronze and those of the Stone Age is as great as that now existing between the Maori and the gentle Hindoo; and in some, though not in all, parts the Bronze-users appear to have as entirely extirpated the Stone-users, as the Maoris, in their cannibal days, would have extirpated any similarly weaker race. The facts as seen by me, when in company with Canon Greenwell, and upon other occasions, appear to me to justify some such statement as this, as to the introduction of bronze into this country. The stone-using inhabitants of Great Britain, if not also of Ireland, may have had their first introduction to a knowledge of bronze in the way of peaceful barter and commerce. Some probability is given to such a view as this by the fact that some of the earliest bronze axes are evidently moulded upon the pattern furnished by stone weapons, just as in North America, where there was a Copper Age, the copper arrow-heads are modelled

(see Lubbock, Pre-historic Times, sec. ed., 1869, p. 245) on the type of their stone ones. But with improved and advanced Bronze weapons in this country, we find, invariably within my experience, an improved and advanced race of men, so far as powerful limbs, tallness of stature, and capacious crania, do make one race of men superior to another. This race of men, besides their physical, present us with many ceremonial and other differences; their burial mounds are round; their pottery is of another kind, or kinds rather, as they have funeral as well as other wares, the former of which the stone men had not; the ornaments they buried with their dead are of a different kind, type, and material; finally the numbers of dead interred in round barrows, and the numbers of round barrows themselves, are very much greater than those of the dead interred in long barrows, and than those of the round barrows themselves. All this seems to me to point to a conquest of this country having been effected by Bronze-using invaders, who came in great numbers, probably as has been elsewhere suggested, from the Cimbric peninsula, which was once again in the Iron Age, viz., in the Iron Age of Sweden and Cnut, an *officina gentium victricum*. If the Danes in a recent war had been as much in advance of their enemies in the adoption of improved weapons of war, as *ex hypothesi* they were in the Bronze Age, and *de facto* in the Iron Age, of the inhabitants of these islands, Schleswig-Holstein might still have been an appanage of Denmark.

I take this opportunity of remarking that anybody who will take the trouble of reading the few lines which come in Hesiod's "Works and Days," 144-148, just before the often quoted line as to the sequence of the Bronze and Iron Ages, will find that he had somehow become as much impressed with the vast size and brute strength of the bronze-using people as I, in spite of the enrrtently accepted statements as to the small hands of the men of that era, have become from actual handling of the bones. Bronze Age tumuli, however, may have been excavated, indeed, as the history of the examination of the tomb of Theseus, at Scyros, they actually were excavated in the days of very early bards, such as the one just referred to.



Virgil's line

“Grandiaque effossis mirabitur ossa sepulchris

expresses the tendency to magnify the size of such *trouvailles*; still there was solid fact for what Hesiod wrote, *i.e.*, and Ovid might have given more space to insisting upon this very distinctive characteristic of the Bronze Age, than he has in his re-production of Hesiod, *Metamorph.* i., 125-127.

Tertia post illam successit ahenea proles,  
Sevior ingeniis, et ad horrida promptior arma;  
Non scelerata tamen: de duro est ultima ferro.

In modern Europe we have but some half-dozen millions of men under arms at the present moment, and we have lost by war in the last twenty-five years something under a couple of millions only, by the accidents inseparable from modern fighting; and it is difficult for us, consequently, to realize, even approximatively, the terrible conditions prevalent in the “bella, horrida bella” of the Bronze Age. Hésiod appears to have been much impressed by what tradition told him of it; he does not, however, appear to have thought his own time so very much better, as we have such good reason for thinking ours is.

I have sometimes thought that the comparison (for which see Max Müller, *Lectures* ii., p. 256, 8th edition, 1875) by the Sanskrit Writers, of copper to the muscles or flesh of an animal may really have been a comparison of greenish bronze to muscles taking on a greenish hue from decomposition, and that we should thus save ourselves from supposing that copper, which, as a metal, is eminently “red,” should have been contrasted by our forefathers with something, iron, to wit, which they compared to blood. At any rate, leaving both mythology and philology, I may say that Sir John Lubbock has given us excellent reasons for doubting whether Europe, or at least the western part of it, ever went through a pure copper stage, as America, so rich in native copper, did. And as regards metallie tin being used for weapons at least, I have come upon only a single statement which could bear such a meaning; this statement is given by Klemm *Germanische Alterthumskunde*, p. 19, in the following words: “Ein Stück

aus reinem Zinn fand Kortum in der Ruhenthal Grabstatte," s. 8, 105. It is plain, however, that this may have been a "find" of an ornament as distinguished from an implement made of unalloyed metallic tin.

There are two Greek words standing at the end of line 612 of the Agamemnon of Æschylus, which mean "baths for copper" but which are usually translated "dyeing of copper" and are supposed to be a proverbial mode of indicating an impossibility, or, as the Germans put it, an "Unding." I strongly suspect that these words have attained this secondary signification, not from any reference to colouring, but simply to "tempering," and that the mode of tempering bronze having been a secret, it has to be considered something *supra*- and ultimately *contra*-natural. If this suggestion is true, we have in it a fresh argument for the view which teaches that the discovery of alloying copper with tin was Extra-European in origin. There is another new argument for the same conclusion, and for the corollary to it, that bronze, like the Jade, Jadeit, and Nephrit of the preceding or Stone Period, and like all imported articles in such times, must have been scarce and highly valued; and this argument lies in the fact that the use of stone weapons survived so long after the introduction of this alloy. This was forced upon me in the examination this year of certain barrows in Somersetshire, proved to be of the Bronze Period by the discovery in them of bronze weapons, with burnt human bones, in which worked flints were in such abundance, that had it not been for the discovery of the bronze implements, we might almost have supposed that we were dealing with interments of the Stone Age. These barrows were in a district (that of Castle-Cary) the surface strata of which are low down in the lower secondary formations, yet the worked flints, and they not only "strike-a-lights" or "thumb-flints," but scrapers, were as abundant as they might have been in a tumulus upon a chalk down. Their varied quality and great quantity renders it impossible to think that they are in such a district merely thrown in ceremonially, and are evidence to the effect that, though tin and copper were available



enough, and side by side, at no greater distance than Cornwall, those particular deposits had not then been utilized for the manufacture in question.

Let us now pass to the Stone Age. I have not the knowledge requisite for sub-dividing the Bronze Age into distinct periods ; and looking at the question in the light which played over the Somersetshire hills, when I was employed, as just now stated, upon them, I doubt whether any sub-division of it, as it was in England, can be justified. A Copper Age, no doubt, must have existed, and did exist, in America, antecedently to the Age of copper, alloyed with tin ; but there is no evidence that it ever existed in England, at least. More may be said, on the authority of Polybius and on other evidence, for the sub-division of the Iron Age into two periods, one of which, the earlier of course, had not learnt the art of tempering iron, whilst to it a second, "the age of steel succeeded then." But as regards the Stone Age we have no need to have recourse to mere probable arguments and *à priori* evidence. There is no doubt whatever that the Stone Age is divisible into two great periods upon several principles, which, however, make their several sections in the same plane. We can look at a stone weapon and ask ourselves one or other of these three questions ; firstly, was it intended to be used in the hand, or used as hafted ? Secondly, has it been polished and ground up, or has it been left simply chipped over with conchoidal fractures ? Thirdly, was it found in company with pottery, however rude, or was it found in some river-gravelbed, in company with no other evidence of human handiwork, but with the bones of mammoth and rhinoceros ? If a stone weapon is so fashioned that we can see that it was intended to be stuck into a handle or haft, and if it is polished, we may be sure that it belonged to a later than the mammoth period in this country, and that it may be spoken of as Neolithic in contra-distinction to the Palæolithic weapons. It is true that in the great factory for flint weapons, which has been described by Major-General Lane Fox (Journal Anth. Inst., v 3, 1876), at Cissbury, an implement, or implements, which could only be used as held in the naked hand, came out during the period of the excavations carried on there, and amongst

multitudes of "celts," which were as obviously intended to be used in handles. But survivals were not unknown in the great Stone Age any more than in our great Steel Age, and for the very various manipulative processes which the working of a *Flint-mine*, with its tortuous galleries, necessitating an amount of "body-bending toil," no way inferior to that necessitated by the galleries of the modern coal-pit, a pointed stone weapon which had a blunt end fitted for a hand grasp, would not rarely have its advantage. The fact that at Cissbury, as also at Grimes Graves, in Norfolk (for which see Journal, Ethn. Soc., N.S., ii, p. 214), and at Spienne, in Belgium, (for which see Mem. Soc. Sci. et Arts, der Hainaut, 1866-7, p. 355), it was found worth while to undertake and execute such extensive works, as are those flint-mines, enables us to realize the meaning of the words "Stone Age" very vividly. The demand for these weapons was so great that it was found profitable to go through all this toil to supply it; the margin of advantage which made it profitable, lying in the mineralogical fact that a flint taken freshly out of its chalky matrix, and retaining its normal hygrometric properties, is more workable and plastic than a flint which has been rolled about the world in floods *per mare per terram*. A modern workman will break flints fresh from the chalk for a shilling, whilst for an equal amount of results for gravel pebbles he will charge you eighteen-pence. It may seem something of a contradiction to the principles of the identity of the period of handled, with that of polished, as opposed to chipped flints, to say that the flints manufactured at Cissbury were, with the few exceptions alluded to, all intended to be fitted with handles, and yet that they were all left unpolished; but the process of polishing a flint, when *finely* chipped, as these are, is a very easy one, involving only the use of a little sand and water to rub the broad chipped cutting edge into smoothness, on a stone such as modern savages use for the purpose; and the modern manufactory of metal weapons shows us that weapons and implements of all kinds are, from certain considerations of expediency, stored and stacked in an unfinished state, before being sent out on, or for, sale.

One point I should wish here to put upon record, relatively to the excavations at Cissbury. In my paper on "The Animal Remains found at Cissbury," published in the *Journal of the Anthropological Institute*, for July, 1876, vi., p. 22, as also in "British Barrows," p. 742, 1877, I expressed myself as having been much impressed by what I had seen to the effect that the pitfall, especially as eked out with certain accessories, had counted for a great deal in the economy (if this be not to profane the word) of the Stone Age. In the earlier of the two places referred to, I say "Hurdles of gorse probably were arranged on the principles of the wicker hoops in a decoy, and it is easy to see how, by such a plan, eked out, perhaps, by the firing of heaps of the same useful material, a wild bull, or a herd, might be driven over a pitfall." In the latter, I say "It requires a greater effort of imagination on our part to imagine a pack of wild dogs co-operating with prisca men in driving a herd of wild cattle or wild pigs (both of which were represented in the Cissbury Pits) along a track in which a pitfall had been dug and covered over. Still what we know justifies us, &c." When I wrote these words, I was very distinctly of opinion that the suggestion they contain was, however obvious, yet entirely an original and novel one; I was rudely, yet not unpleasantly, undeceived a few days ago, when verifying, as it is always well to do by often quoted lines, the lines of Lucretius, v. 1285. I "tried back," as I have heard it expressed elsewhere to the preceding context, which greatly fascinated me, not only by its grand roll and flow, but also by the singularly clear insight which it gave me into the way in which their author had faced the great problem of "Kulturgeschichte." In that context I came, to my great surprise, upon two lines, 1249-1250, which contain a suggestion at once half coinciding with, and half contradicting my own as just quoted. Lucretius, undoubtedly, can claim priority as to the part of his hypothesis in which he and I agree; and perhaps I had better not claim originality as to either part of mine; but this question is of little consequence. Here are the lines of Lucretius, v. 1249-1250:—

Nam fovea atque igni prius est venariæ ortum  
Quam sepiæ plagis saltum canibusque ciere.



To this disquisition on the several Ages of Iron, Bronze, and Stone, I here will append an account of the disinterment of a skeleton of the Iron (Roman) Period, which took place by the permission of the Earl Bathurst, yesterday, Aug. 27, in Oakley Park, during heavy rain, in the presence of the Hon. Mrs. Lennox, the Hon. Miss M. Ponsonby, Professor A. H. Church, Christopher Bowley, Esq., R. A. Anderson, Esq., E. C. Sewell, Esq., and myself. The skeleton was contained in a stone coffin, covered by a flat stone slab, much of the same character as the undoubted Roman coffins found at York and elsewhere in England, though, unlike many of them, it contained no relic besides the skeleton itself, and a Roman nail, of a type known at Cirencester. The dimensions of the coffin were :—

External	{	Length - - -	7' 2"
		Width at N.E. end -	2' 8"5
		Width at S.W. end -	2' 4"
Internal	{	Length - - -	5' 8"
		Width at N.E. end -	1' 5"5
		Width at S.W. end -	1' 5"

Its bearings were from N.E. by E. to S.W. by W., a rather unusual orientation, it being more common to find the feet at a point a little south, than at a point a little north, of the rising sun, deaths being more numerous in the winter than in the summer quarters of the year. The head, however, was at the north-eastward end, and this appears to make it probable that this coffin dates as far back as the time when the Romans had relinquished the practice of cremation, without accepting the religion, or, at least, the religious practices of Christianity; to a time, that is, between the death of Severus, in the first decade of the third, and the accession of Constantine, in the first decade of the fourth century, A.D. The skeleton was in good preservation; the only disturbance to which it had been subjected, of a violent kind, previous to our exploration, having been quite recently inflicted by some gay young anthropologists from the day school, who, in defiance of the school-board's inspector, had, in their zeal for

science, been poking sticks through a chink at the north-east end of the coffin, and had slightly displaced the skull inwards, besides damaging its outer table and exposing the diploe. The lower jaw, however, had not been displaced. On the back of the skull, and also around the first cervical vertebra, there is a considerable deposit of lime, probably the remains of quicklime which the Romans often put into their coffins, as may be seen to great advantage in the museum at York. I did not observe this till the bones were cleaned in the museum here; and I did not note whether there was any hole in the bottom of the coffin, whereby an exit would be possible for this lime as dissolved by carbonated water passing down into the coffin. Some of the other bones were blackened in places by carbonaceous deposit from the leaves and other vegetable matters, such as, if my memory serves me, beech nuts, which had found their way into the coffin and decayed there, and also from the decay of the soft parts of the body, and the wrappings of it. The nail found in the coffin may, indeed, appear to indicate that some sort of coffin of wood was used, as well as the coffin of stone; there would have been plenty of room for one, as the length of the Roman body was but five feet one inch, whilst the internal length of the stone coffin was 5' 8"; but I think this nail may have worked its way in from without, through the same chinks which gave inlet to the other foreign bodies already mentioned.

The left arm lay alongside the body, and the left hand rested on the pelvis; the right arm was stretched upwards with the hand at the face; the left leg was drawn up to the centre of the body, or thereabouts. The distance from the end of the coffin to the pelvis was 2' 11", leaving a space of about 4" between the sole of the foot and the end of the coffin.

My thanks are eminently due to Professor A. H. Church and to E. C. Sewell, Esq., for their help before, after, and during this disinterment. For the measurements and descriptions following, I am more entirely responsible than for what has preceded.



MEASUREMENTS AND DESCRIPTION OF SKELETON,  
FROM STONE COFFIN IN OAKLEY PARK,

On the Estate of the EARL OF BATHURST,

August 27th, 1877.

*Measurements of Skull.*

External Length,	7" 3.
Frontoinial Length,	7".
Extreme Breadth,	5" 8.
Upright Height,	5" 5.
Absolute Height,	5" 2.
Circumference,	21" 3.
Frontal Arc,	5" 2.
Parietal Arc,	4" 5.
Occipital Arc,	4" 5.
Greatest Frontal Width,	4" 9.
Greatest Occipital Width,	4" 8.
Basiscranial Axis,	3" 75.

*Measurements of Face.*

Length of Face	2" 25.
Breadth of Face.	
Basio-subnasal Line,	3" 4.
Basio-alveolar Line,	3" 5.
Height of Orbit,	1" 5.
Width of Orbit,	1" 6.
Length of Nose,	2" 0.
Width of Nose,	1" 0.
Depth of lower Jaw, at Symphysis,	1" 1.
Width of lower Jaws, ramus	1" 3.
Interangular diameter	3" 6.
Cephalic Index	" 79.
Anteroposterior Index	" 55.
Femur	17"
Tibia	12" 2.
Humerus	11" 5.
Stature	5' 1".

Age, about 30.

A well filled-out skull, on the whole, though the parietal tubera are still distinguishable as is often the case in female skulls ; the forehead is vertical, but the parietal region slopes with considerable obliquity in its posterior two-fifths ; the plane of the superior occipital squama lies distinctly behind that of the posterior part

of the parietals, so that a very marked undulation is formed at the line of meeting of the two bones. The relation of inferiority held by the height to the breadth of the skull is probably merely a sexual character ; the vertical contour being eminently that of the dolichocephalic type of skulls, whilst the smallness of the mastoid, the slightness of the supra-orbital ridges, and the feebleness of the lower jaw, shew what the characters of the limb and trunk bones also show, viz., that the owner of this skeleton was a woman.

This woman had lost the second molar of the left half of her upper jaw some time before the evolution of the wisdom teeth of the lower jaw of the same side, and probably not very long after the evolution of the second molar of the same side of the lower jaw. The first molar of the right half of the upper jaw had been similarly lost early in life ; the second molar next to it was largely excavated, and the wisdom tooth on to which that carious cavity opened had an abscess at its fangs. The lower jaw teeth, though all sound except the left second pre-molar, are much crowded together. It is not clear that the wisdom tooth of the left upper jaw was ever developed. Six abnormalities is a large proportion in the dental series of a woman who was not much beyond thirty years of age.

The slightness and straightness of the collar bones ; the horizontal direction of the neck of the femur ; the characters of the *os innominatum* and other bones, show the skeleton to have belonged to a woman of about thirty years of age, or a little over that age. The suture between the first and second vertebra of the sacrum is widely, but not symmetrically open, and its patency with a greater width on the left than on the right side, must be considered as due to some morbid process. All the sutures and epiphyses of the limbs are closed and ankylosed ; So also are, to a great extent, the sagittal and lambdoid sutures in the skull. The characters of the facial bones, such as those of the elevation of the nasal bones, and the proportions indicated by the measurements, show that this Romano-British lady may have deserved the praise

of Martial as expressed in the following lines :—

“ Claudia cæruleis quam sit Rufina Britannis,  
Edita, quam Latie pectora plebis habet !  
Quale decus formæ, Romanam credere matres,  
Italides possunt———”

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